OM-2210 176 876N
April 2000

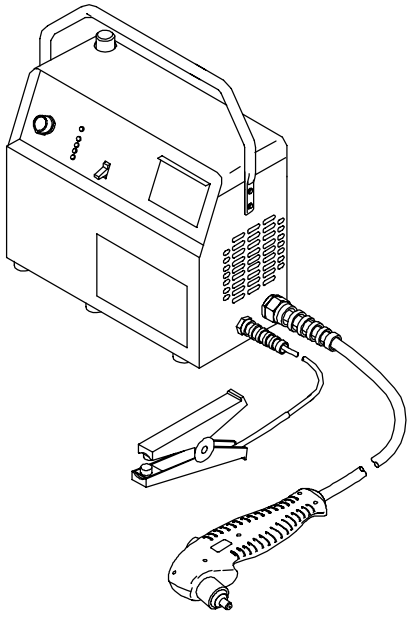
Processes

Air Plasma Cutting and Gouging

Description

Air Plasma Cutter

Spectrum® 300



And Non-CE Models

OWNER'S MANUAL

Visit our website at
www.MillerWelds.com

From Miller to You

Thank you and *congratulations* on choosing Miller. Now you can get the job done and get it done right. We know you don't have time to do it any other way.

That's why when Niels Miller first started building arc welders in 1929, he made sure his products offered long-lasting value and superior quality. Like you, his customers couldn't afford anything less. Miller products had to be more than the best they could be. They had to be the best you could buy.

Today, the people that build and sell Miller products continue the tradition. They're just as committed to providing equipment and service that meets the high standards of quality and value established in 1929.

This Owner's Manual is designed to help you get the most out of your Miller products. Please take time to read the Safety precautions. They will help you protect yourself against potential hazards on the worksite. We've made installation and operation quick and easy. With Miller you can count on years of reliable service with proper maintenance. And if for some reason the unit needs repair, there's a Troubleshooting section that will help you figure out what the problem is. The parts list will then help you to decide which exact part you may need to fix the problem. Warranty and service information for your particular model are also provided.

ISO 9001 REGISTERED QUALITY SYSTEM

Miller is the first welding equipment manufacturer in the U.S.A. to be registered to the ISO 9001 Quality System Standard.

Miller Electric manufactures a full line of welders and welding related equipment. For information on other quality Miller products, contact your local Miller distributor to receive the latest full line catalog or individual catalog sheets. **To locate your nearest distributor or service agency call 1-800-4-A-Miller, or visit us at www.MillerWelds.com on the web.**

TRUE BLUE® WARRANTY

Working as hard as you do – every power source from Miller is backed by the most hassle-free warranty in the business.

Miller offers a Technical Manual which provides more detailed service and parts information for your unit. To obtain a Technical Manual, contact your local distributor. Your distributor can also supply you with Welding Process Manuals such as SMAW, GTAW, GMAW, and GMAW-P.

Miller® *The Power of Blue.*

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⚠ WARNING

This product, when used for welding or cutting, produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code Section 25249.5 et seq.)

Declaration of Conformity for European Community (CE) Products

NOTE ☞	*This information is provided for units with CE certification (see rating label on unit).*

Manufacturer's Name: Miller Electric Mfg. Co.

Manufacturer's Address: 1635 W. Spencer Street
Appleton, WI 54914 USA

Declares that the product: **SPECTRUM® 300**

conforms to the following Directives and Standards:

Directives

Electromagnetic Compatibility Directives: 89/336/EEC, 92/31/EEC

Low Voltage Directive: 73/23/EEC

Machinery Directives: 89/392/EEC, 91/368/EEC, 93/C 133/04, 93/68/EEC

Standards

Electromagnetic compatibility (EMC) Product standard for arc welding equipment: EN50199: August 1995

Safety Requirements for Arc Welding Equipment part 1: EN 60974-1: 1989

Arc Welding Equipment Part 1: Welding Power Sources: IEC 974-1 (September 1998 – Draft revision)

Degrees of Protection provided by Enclosures (IP code): IEC 529: 1989

Plasma Cutting Systems for Manual Use: EN 50192: 1995

European Contact: Mr. Luigi Vacchini, Managing Director
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Via Privata Iseo
20098 San Giuliano
Milanese, Italy

Telephone: 39(02)98290-1
Fax: 39(02)98281-552

SECTION 1 – SAFETY PRECAUTIONS - READ BEFORE USING

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1-1. Symbol Usage

Means Warning! Watch Out! There are possible hazards with this procedure! The possible hazards are shown in the adjoining symbols.

▲ **Marks a special safety message.**

☞ *Means "Note"; not safety related.*

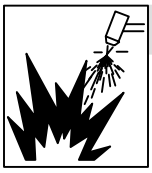
This group of symbols means Warning! Watch Out! possible ELECTRIC SHOCK, MOVING PARTS, and HOT PARTS hazards. Consult symbols and related instructions below for necessary actions to avoid the hazards.

1-2. Plasma Arc Cutting Hazards

▲ **The symbols shown below are used throughout this manual to call attention to and identify possible hazards. When you see the symbol, watch out, and follow the related instructions to avoid the hazard. The safety information given below is only a summary of the more complete safety information found in the Safety Standards listed in Section 1-4. Read and follow all Safety Standards.**

▲ **Only qualified persons should install, operate, maintain, and repair this unit.**

▲ **During operation, keep everybody, especially children, away.**



CUTTING can cause fire or explosion.

Hot metal and sparks blow out from the cutting arc. The flying sparks and hot metal, hot workpiece, and hot equipment can cause fires and burns. Check and be sure the area is safe before doing any cutting.

- Protect yourself and others from flying sparks and hot metal.
- Do not cut where flying sparks can strike flammable material.
- Remove all flammables within 35 ft (10.7 m) of the cutting arc. If this is not possible, tightly cover them with approved covers.
- Be alert that sparks and hot materials from cutting can easily go through small cracks and openings to adjacent areas.
- Watch for fire, and keep a fire extinguisher nearby.
- Be aware that cutting on a ceiling, floor, bulkhead, or partition can cause fire on the hidden side.
- Do not cut on closed containers such as tanks or drums.
- Connect work cable to the work as close to the cutting area as practical to prevent cutting current from traveling long, possibly unknown paths and causing electric shock and fire hazards.
- Never cut containers with potentially flammable materials inside – they must be emptied and properly cleaned first.
- Do not cut in atmospheres containing explosive dust or vapors.
- Do not cut pressurized cylinders, pipes, or vessels.
- Do not cut containers that have held combustibles.
- Wear oil-free protective garments such as leather gloves, heavy shirt, cuffless trousers, high shoes, and a cap.
- Do not locate unit on or over combustible surfaces.
- Remove any combustibles, such as a butane lighter or matches, from your person before doing any cutting.

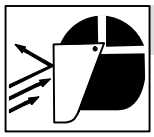
ELECTRIC SHOCK can kill.

Touching live electrical parts can cause fatal shocks or severe burns. The torch and work circuit are electrically live whenever the output is on. The input power circuit and machine internal circuits are also live when power is on. Plasma arc cutting requires higher voltages than welding to start and maintain the arc (200 to 400 volts dc are common), but also uses torches designed with safety interlock systems which turn off the machine when the shield cup is loosened or if tip touches electrode inside the nozzle. Incorrectly installed or improperly grounded equipment is a hazard.

- Do not touch live electrical parts.
- Wear dry, hole-free insulating gloves and body protection.
- Insulate yourself from work and ground using dry insulating mats or covers big enough to prevent any physical contact with the work or ground.
- Do not touch torch parts if in contact with the work or ground.
- Turn off power before checking, cleaning, or changing torch parts.
- Disconnect input power before installing or servicing this equipment. Lockout/tagout input power according to OSHA CFR 1910.147 (see Safety Standards).
- Properly install and ground this equipment according to its Owner's Manual and national, state, and local codes.
- Check and be sure that input power cord ground wire is properly connected to ground terminal in disconnect box or that cord plug is connected to a properly grounded receptacle outlet – always verify the supply ground.
- When making input connections, attach proper grounding conductor first.
- Frequently inspect input power cord for damage or bare wiring – replace cord immediately if damaged – bare wiring can kill.
- Turn off all equipment when not in use.
- Inspect and replace any worn or damaged torch cable leads.
- Do not wrap torch cable around your body.
- Ground the workpiece to a good electrical (earth) ground if required by codes.
- Use only well-maintained equipment. Repair or replace damaged parts at once.
- Wear a safety harness if working above floor level.
- Keep all panels and covers securely in place.
- Do not bypass or try to defeat the safety interlock systems.
- Use only torch(es) specified in Owner's Manual.
- Keep away from torch tip and pilot arc when trigger is pressed.
- Clamp work cable with good metal-to-metal contact to workpiece (not piece that will fall away) or worktable as near the cut as practical.
- Insulate work clamp when not connected to workpiece to prevent contact with any metal object.

SIGNIFICANT DC VOLTAGE exists after removal of input power on inverters.

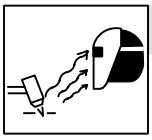
- Turn OFF inverter, disconnect input power, and discharge input capacitors according to instructions in Maintenance Section before touching any parts.



FLYING SPARKS can cause injury.

Sparks and hot metal blow out from the cutting arc. Chipping and grinding cause flying metal.

- Wear approved face shield or safety goggles with side shields.
- Wear proper body protection to protect skin.
- Wear flame-resistant ear plugs or ear muffs to prevent sparks from entering ears.



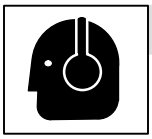
ARC RAYS can burn eyes and skin.

Arc rays from the cutting process produce intense visible and invisible (ultraviolet and infrared) rays that can burn eyes and skin.

- Wear face protection (helmet or shield) with correct shade of filter to protect your face and eyes when cutting or watching. ANSI Z49.1 (see Safety Standards) suggests a No. 9 shade (with No. 8 as minimum) for all cutting currents less than 300 amperes. Z49.1 adds that lighter filter shades may be used when the arc is hidden by the workpiece. As this is normally the case with low current cutting, the shades suggested in Table 1 are provided for the operator's convenience.
- Wear approved safety glasses with side shields under your helmet or shield.
- Use protective screens or barriers to protect others from flash and glare; warn others not to watch the arc.
- Wear protective clothing made from durable, flame-resistant material (leather and wool) and foot protection.

Table 1. Eye Protection For Plasma Arc Cutting

Current Level In Amperes	Minimum Shade Number
Below 20	#4
20 – 40	#5
40 – 60	#6
60 – 80	#8



NOISE can damage hearing.

Prolonged noise from some cutting applications can damage hearing if levels exceed limits specified by OSHA (see Safety Standards).

- Use approved ear plugs or ear muffs if noise level is high.
- Warn others nearby about noise hazard.

FUMES AND GASES can be hazardous.

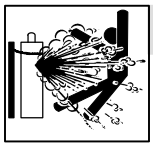
Cutting produces fumes and gases. Breathing these fumes and gases can be hazardous to your health.

- Keep your head out of the fumes. Do not breathe the fumes.
- If inside, ventilate the area and/or use exhaust at the arc to remove cutting fumes and gases.
- If ventilation is poor, use an approved air-supplied respirator.
- Read the Material Safety Data Sheets (MSDSs) and the manufacturer's instruction for metals to be cut, coatings, and cleaners.
- Work in a confined space only if it is well ventilated, or while wearing an air-supplied respirator. Fumes from cutting and oxygen depletion can alter air quality causing injury or death. Be sure the breathing air is safe.
- Do not cut in locations near degreasing, cleaning, or spraying operations. The heat and rays of the arc can react with vapors to form highly toxic and irritating gases.
- Do not cut on coated metals, such as galvanized, lead, or cadmium plated steel, unless the coating is removed from the cutting area, the area is well ventilated, and if necessary, while wearing an air-supplied respirator. The coatings and any metals containing these elements can give off toxic fumes when cut.
- Do not cut containers with toxic or reactive materials inside or containers that have held toxic or reactive materials – they must be emptied and properly cleaned first.

PLASMA ARC can cause injury.

The heat from the plasma arc can cause serious burns. The force of the arc adds greatly to the burn hazard. The intensely hot and powerful arc can quickly cut through gloves and tissue.

- Keep away from the torch tip.
- Do not grip material near the cutting path.
- The pilot arc can cause burns – keep away from torch tip when trigger is pressed.
- Wear proper flame-retardant clothing covering all exposed body areas.
- Point torch away from your body and toward work when pressing the torch trigger – pilot arc comes on immediately.
- Turn off power source and disconnect input power before disassembling torch or changing torch parts.
- Use only torch(es) specified in the Owner's Manual.



CYLINDERS can explode if damaged.

Gas cylinders contain gas under high pressure. If damaged, a cylinder can explode. Since gas cylinders are normally part of metalworking processes, be sure to treat them carefully.

- Protect compressed gas cylinders from excessive heat, mechanical shocks, slag, open flame, sparks, and arcs.
- Install and secure cylinders in an upright position by chaining them to a stationary support or equipment cylinder rack to prevent falling or tipping.
- Keep cylinders away from any cutting or other electrical circuits.
- Never allow electrical contact between a plasma arc torch and a cylinder.
- Never cut on a pressurized cylinder – explosion will result.
- Use only correct gas cylinders, regulators, hoses, and fittings designed for the specific application; maintain them and associated parts in good condition.
- Turn face away from valve outlet when opening cylinder valve.
- Keep protective cap in place over valve except when cylinder is in use or connected for use.
- Read and follow instructions on compressed gas cylinders, associated equipment, and CGA publication P-1 listed in Safety Standards.

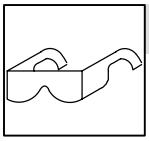
1-3. Additional Symbols For Installation, Operation, And Maintenance

HOT PARTS can cause severe burns.

- Do not touch hot parts bare handed.
- Allow cooling period before working on torch.

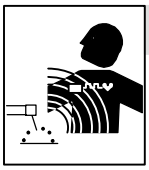
MOVING PARTS can cause injury.

- Keep away from moving parts such as fans.
- Keep all doors, panels, covers, and guards closed and securely in place.



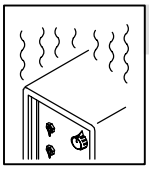
FLYING METAL can injure eyes.

- Wear safety glasses with side shields or face shield.



MAGNETIC FIELDS can affect pacemakers.

- Pacemaker wearers keep away.
- Wearers should consult their doctor before going near plasma arc cutting operations.



OVERUSE can cause OVERHEATING.

- Allow cooling period; follow rated duty cycle.
- Reduce amperage (thickness) or reduce duty cycle before starting to cut again.

EXPLODING HYDROGEN hazard.

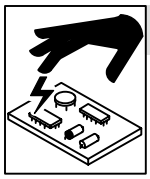
- When cutting aluminum underwater or with the water touching the underside of the aluminum, free hydrogen gas may collect under the workpiece.
- See your cutting engineer and water table instructions for help.

FALLING UNIT can cause injury.

- Use lifting eye to lift unit only, NOT running gear, gas cylinders, or any other accessories.
- Use equipment of adequate capacity to lift unit.
- If using lift forks to move unit, be sure forks are long enough to extend beyond opposite side of unit.

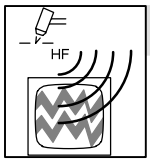
FIRE OR EXPLOSION hazard.

- Do not locate unit on, over, or near combustible surfaces.
- Do not install unit near flammables.
- Do not overload building wiring – be sure power supply system is properly sized, rated, and protected to handle this unit.



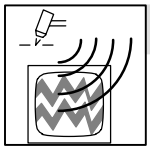
STATIC (ESD) can damage PC boards.

- Put on grounded wrist strap BEFORE handling boards or parts.
- Use proper static-proof bags and boxes to store, move, or ship PC boards.



H.F. RADIATION can cause interference.

- High frequency (H.F.) can interfere with radio navigation, safety services, computers, and communications equipment.
- Have only qualified persons familiar with electronic equipment perform this installation.
- The user is responsible for having a qualified electrician promptly correct any interference problem resulting from the installation.
- If notified by the FCC about interference, stop using the equipment at once.
- Have the installation regularly checked and maintained.
- Keep high-frequency source doors and panels tightly shut, keep spark gaps at correct setting, and use grounding and shielding to minimize the possibility of interference.



ARC CUTTING can cause interference.

- Electromagnetic energy can interfere with sensitive electronic equipment such as computers and computer-driven equipment such as robots.
- To reduce possible interference, keep cables as short as possible, close together, and down low, such as on the floor.
- Locate cutting operation 100 meters from any sensitive electronic equipment.
- Be sure this cutting power source is installed and grounded according to this manual.
- If interference still occurs, the user must take extra measures such as moving the machine, using shielded cables, using line filters, or shielding the work area.

1-4. Principal Safety Standards

Safety in Welding and Cutting, ANSI Standard Z49.1, from American Welding Society, 550 N.W. LeJeune Rd, Miami FL 33126

Safety and Health Standards, OSHA 29 CFR 1910, from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Recommended Practices for Plasma Arc Cutting, American Welding Society Standard AWS C5.2, from American Welding Society, 550 N.W. LeJeune Rd, Miami, FL 33126

Recommended Safe Practices for the Preparation for Welding and Cutting of Containers That Have Held Hazardous Substances, American Welding Society Standard AWS F4.1, from American Welding Society, 550 N.W. LeJeune Rd, Miami, FL 33126

National Electrical Code, NFPA Standard 70, from National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

Safe Handling of Compressed Gases in Cylinders, CGA Pamphlet P-1, from Compressed Gas Association, 1235 Jefferson Davis Highway, Suite 501, Arlington, VA 22202.

Code for Safety in Welding and Cutting, CSA Standard W117.2, from Canadian Standards Association, Standards Sales, 178 Rexdale Boulevard, Rexdale, Ontario, Canada M9W 1R3.

Safe Practices For Occupation And Educational Eye And Face Protection, ANSI Standard Z87.1, from American National Standards Institute, 1430 Broadway, New York, NY 10018.

Cutting And Welding Processes, NFPA Standard 51B, from National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

1-5. EMF Information

Considerations About Welding Or Cutting And The Effects Of Low Frequency Electric And Magnetic Fields

Welding or cutting current, as it flows through the welding or cutting cables, will cause electromagnetic fields. There has been and still is some concern about such fields. However, after examining more than 500 studies spanning 17 years of research, a special blue ribbon committee of the National Research Council concluded that: “The body of evidence, in the committee’s judgment, has not demonstrated that exposure to power-frequency electric and magnetic fields is a human-health hazard.” However, studies are still going forth and evidence continues to be examined. Until the final conclusions of the research are reached, you may wish to minimize your exposure to electromagnetic fields when welding or cutting.

To reduce magnetic fields in the workplace, use the following procedures:

1. Keep cables close together by twisting or taping them.
2. Arrange cables to one side and away from the operator.
3. Do not coil or drape cables around your body.
4. Keep cutting power source and cables as far away from operator as practical.
5. Connect work clamp to workpiece as close to the cut as possible.

About Pacemakers:

Pacemaker wearers consult your doctor first. If cleared by your doctor, then following the above procedures is recommended.

SECTION 1 – CONSIGNES DE SÉCURITÉ – LIRE AVANT UTILISATION

1-1. Signification des symboles

Signifie Mise en garde ! Soyez vigilant ! Cette procédure présente des risques de danger ! Ceux-ci sont identifiés par des symboles adjacents aux directives.

▲ **Identifie un message de sécurité particulier.**

☞ *Signifie NOTA ; n'est pas relatif à la sécurité.*

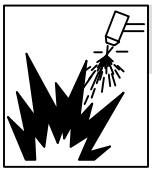
Ce groupe de symboles signifie Mise en garde ! Soyez vigilant ! Il y a des risques de danger reliés aux CHOCS ÉLECTRIQUES, aux PIÈCES EN MOUVEMENT et aux PIÈCES CHAUDES. Reportez-vous aux symboles et aux directives ci-dessous afin de connaître les mesures à prendre pour éviter tout danger.

1-2. Dangers liés au coupage à l'arc au plasma

▲ **Les symboles présentés ci-après sont utilisés tout au long du présent manuel pour attirer votre attention et identifier les risques de danger. Lorsque vous voyez un symbole, soyez vigilant et suivez les directives mentionnées afin d'éviter tout danger. Les consignes de sécurité présentées ci-après ne font que résumer l'information contenue dans les normes de sécurité énumérées à la section 1-5. Veuillez lire et respecter toutes ces normes de sécurité.**

▲ **L'installation, l'utilisation, l'entretien et les réparations ne doivent être confiés qu'à des personnes qualifiées.**

▲ **Au cours de l'utilisation, tenir toute personne à l'écart et plus particulièrement les enfants.**



LE COUPAGE présente un risque de feu ou d'explosion.

Des particules de métal chaud et des étincelles peuvent jaillir de la pièce au moment du coupage. Les étincelles et le métal chaud, la pièce à couper chauffée et l'équipement chaud peuvcnt causer un feu ou des brûlures. Avant de commencer à travailler, assurez–vous que l'endroit est sécuritaire.

- Protégez–vous, ainsi que toute autre personne travaillant sur les lieux, contre les étincelles et le métal chaud.
- Ne coupez pas dans un endroit où des étincelles pourraient atteindre des matières inflammables.
- Déplacez toute matière inflammable se trouvant à l'intérieur d'un périmètre de 10,7 m (35 pi) de la pièce à couper. Si cela est impossible, vous devez les couvrir avec des housses approuvées et bien ajustées.
- Assurez–vous qu'aucune étincelle ni particule de métal ne peut se glisser dans de petites fissures ou tomber dans d'autres pièces.
- Afin d'éliminer tout risque de feu, soyez vigilant et gardez toujours un extincteur à la portée de la main.
- Si vous coupez sur un plafond, un plancher ou une cloison, soyez conscient que cela peut entraîner un feu de l'autre côté.
- Ne coupez pas sur un contenant fermé tel qu'un réservoir ou un bidon.
- Fixez le câble de masse sur la pièce à couper, le plus près possible de la zone à couper afin de prévenir que le courant de coupage ne prenne une trajectoire inconnue ou longue et ne cause ainsi une décharge électrique ou un feu.
- Ne coupez jamais des contenants qui peuvent contenir des matières inflammables. Vous devez en premier lieu les vider et les nettoyer convenablement.
- Ne coupez pas dans un endroit où l'atmosphère risque de contenir de la poussière ou des vapeurs explosives.
- Ne coupez pas de bouteilles, de tuyaux ou de contenants pressurisés.
- Ne coupez pas de contenants qui ont déjà reçu des combustibles.
- Portez des vêtements de protection exempts d'huile tels que des gants en cuir, une veste résistante, des pantalons sans revers, des bottes et un casque.
- Ne placez pas le poste sur une surface combustible ou au–dessus de celle–ci.
- Avant le coupage, retirez tout combustible de vos poches, par exemple un briquet au butane ou des allumettes.

UNE DÉCHARGE ÉLECTRIQUE peut entraîner la mort.

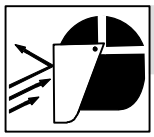
Le fait de toucher à une pièce électrique sous tension peut donner une décharge fatale ou entraîner des brûlures graves. Le chalumeau et le circuit de masse sont automatiquement actifs lorsque le poste est sous tension. L'alimentation d'entrée et les circuits internes de l'appareil le sont également. Le coupage au plasma d'arc exige des tensions plus élevées que le soudage pour amorcer et maintenir l'arc (souvent de 200 à 400 V CC), c'est pourquoi on fait appel à des chalumeaux conçus avec un système de verrouillage sécuritaire qui met l'appareil hors tension lorsque la capsule anti–feu est desserrée ou si le tube touche l'électrode à l'intérieur de la buse. Un poste incorrectement installé ou inadéquatement mis à la terre constitue un danger.

- Ne touchez pas aux pièces électriques sous tension.
- Portez des gants isolants et des vêtements de protection secs et sans trous.
- Isolez–vous de la pièce à couper et du sol en utilisant des housses ou des tapis assez grands afin d'éviter tout contact physique avec la pièce à couper ou le sol.
- Ne touchez pas aux pièces du chalumeau si vous êtes en contact avec la pièce à couper ou le sol.
- Mettez l'appareil hors tension avant d'effectuer la vérification, le nettoyage ou le changement d'une pièce du chalumeau.
- Coupez l'alimentation d'entrée avant d'installer l'appareil ou d'effectuer l'entretien. Verrouillez ou étiquetez la sortie d'alimentation selon la norme OSHA 29 CFR 1910.147 (reportez–vous aux Principales normes de sécurité).
- Installez le poste correctement et mettez–le à la terre convenablement selon les consignes du manuel de l'opérateur et les normes nationales, provinciales et locales.
- Assurez–vous que le fil de terre du cordon d'alimentation est correctement relié à la borne de terre dans la boîte de coupure ou que la fiche du cordon est branchée à une prise correctement mise à la terre – vous devez toujours vérifier la mise à la terre.
- Avant d'effectuer les connexions d'alimentation, vous devez relier le bon fil de terre.
- Vérifiez fréquemment le cordon d'alimentation afin de vous assurer qu'il n'est pas altéré ou à nu, remplacez–le immédiatement s'il l'est. Un fil à nu peut entraîner la mort.
- L'équipement doit être hors tension lorsqu'il n'est pas utilisé.
- Vérifiez et remplacez les cosses du câble du chalumeau si elles sont usées ou altérées.
- Le câble du chalumeau ne doit pas s'enrouler autour de votre corps.
- Si les normes le stipulent, la pièce à couper doit être mise à la terre.
- Utilisez uniquement de l'équipement en bonne condition. Réparez ou remplacez immédiatement toute pièce altérée.
- Portez un harnais de sécurité si vous devez travailler au–dessus du sol.
- Assurez–vous que tous les panneaux et couvercles sont correctement en place.
- N'essayez pas d'aller à l'encontre des systèmes de verrrouillage de sécurité ou de les contourner.
- Utilisez uniquement le ou les chalumeaux recommandés dans le manuel de l'opérateur.

- N’approchez pas le tube du chalumeau et l’arc pilote lorsque la gâchette est enfoncée.
- Le câble de masse doit être pincé correctement sur la pièce à couper, métal contre métal (et non de telle sorte qu’il puisse se détacher), ou sur la table de travail le plus près possible de la ligne de coupage.
- Isoler la pince de masse quand pas mis à la pièce pour éviter le contact avec tout objet métallique.

Il y a DU COURANT CONTINU IMPORTANT dans les convertisseurs après la suppression de l’alimentation électrique.

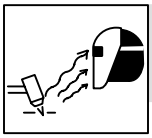
- Arrêter les convertisseurs, débrancher le courant électrique, et décharger les condensateurs d’alimentation selon les instructions indiquées dans la partie entretien avant de toucher les pièces.



LES ÉTINCELLES VOLANTES risquent de provoquer des blessures.

Le coupage plasma produit des étincelles et projections de métal à très haute température. Lorsque la pièce refroidit, du laitier peut se former.

- Portez une visière ou des lunettes de sécurité avec des écrans latéraux approuvées.
- Portez des vêtements de protection adéquats afin de protéger votre peau.
- Ayez recours à des protège–tympans ou à un serre–tête ignifuges afin d’éviter que les étincelles n’entrent dans vos oreilles.



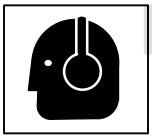
LES RAYONS D’ARC peuvent entraîner des brûlures aux yeux et à la peau.

Les rayons d’arc provenant du procédé de coupage produisent des rayons visibles et invisibles intenses (ultraviolets et infrarouges) qui peuvent entraîner des brûlures aux yeux et à la peau.

- Lorsque vous coupez ou regardez quelqu’un couper, portez un masque ou un écran facial avec le filtre approprié. La norme ANSI Z49.1 (reportez–vous aux Principales normes de sécurité) suggère d’utiliser un filtre de teinte n○ 9 (n○ 8 étant le minimum) pour tout travail de coupage faisant appel à un courant de moins de 300 A. On mentionne également dans la norme Z49.1 qu’un filtre plus faible peut être utilisé lorsque l’arc est caché par la pièce à couper. Comme cela est habituellement le cas pour les travaux de coupage à faible courant, les teintes énumérées au tableau 1 sont fournies à titre d’information pour l’opérateur.
- Porter des lunettes de sécurité à coques latérales sous votre casque ou écran facial.
- Ayez recours à des écrans protecteurs ou à des rideaux pour protéger les autres contre les rayonnements et les éblouissements; prévenez toute personne sur les lieux de ne pas regarder l’arc.
- Portez des vêtements confectionnés avec des matières résistantes et ignifuges (cuir et laine) et des bottes de protection.

Tableau 1. Protection des yeux pour le coupage au plasma d’arc

Intensité de courant en ampères		Filtre de teinte (minimum)
Moins de 20		no. 4
20 – 40		no. 5
40 – 60		no. 6
60 – 80		no. 8



LE BRUIT peut endommager l’ouïe.

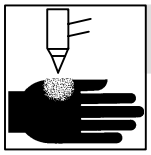
Certaines applications de coupage produisent un bruit constant, ce qui peut endommager l’ouïe si le niveau sonore dépasse les limites permises par l’OSHA (reportez–vous aux Principales normes de sécurité).

- Utilisez des protège–tympans ou un serre–tête antibruit si le niveau sonore est élevé.
- Prévenez toute personne sur les lieux du danger relié au bruit.

LES FUMÉES ET LES GAZ peuvent être dangereux.

Le coupage produit des vapeurs et des gaz. Respirer ces vapeurs et ces gaz peut être dangereux pour la santé.

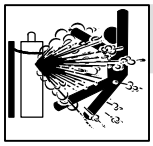
- Ne mettez pas votre tête au–dessus des vapeurs. Ne respirez pas ces vapeurs.
- Si vous êtes à l’intérieur au moment du coupage, ventilez la pièce ou ayez recours à une ventilation aspirante installée près de l’arc pour évacuer les vapeurs et les gaz.
- Si la ventilation est médiocre, utilisez un respirateur anti–vapeurs approuvé.
- Veuillez lire le Material Safety Data Sheets (MSDS) et les instructions du fabricant pour obtenir plus de renseignements sur les métaux à couper, les enrobages et les nettoyants.
- Travaillez dans un espace restreint uniquement s’il est bien ventilé ou si vous portez un respirateur anti–vapeurs. Les vapeurs causées par le coupage et l’épuisement de l’oxygène peuvent altérer la qualité de l’air et entraîner des blessures ou la mort. Assurez–vous que l’air ambiant est sain pour la santé.
- Ne coupez pas dans un endroit près d’opérations de décapage, de nettoyage ou de vaporisation. La chaleur et les rayons d’arc peuvent réagir avec les vapeurs et former des gaz hautement toxiques et irritants.
- Ne coupez pas des métaux enrobés tels que des métaux galvanisés, contenant du plomb ou de l’acier plaqué au cadmium, à moins que l’enrobage ne soit ôté de la surface du métal à couper, que l’endroit où vous travaillez ne soit bien ventilé, ou, si nécessaire, que vous ne portiez un respirateur anti–vapeurs. Les enrobages ou tous métaux qui contiennent ces éléments peuvent créer des vapeurs toxiques s’ils sont coupés.
- Ne coupez pas de contenants qui renferment ou ont renfermés des matières toxiques ou réactives – vous devez en premier lieu les vider et les nettoyer convenablement.



LE PLASMA D’ARC peut entraîner des blessures.

La chaleur dégagée par le plasma d’arc peut entraîner de sérieuses brûlures. La force de l’arc est un facteur qui s’ajoute au danger de brûlures. La chaleur intense et la puissance de l’arc peuvent rapidement passer au travers de gants et de tissus.

- N’approchez pas le tube du chalumeau.
- Ne saisissez pas la pièce à couper près de la ligne de coupage.
- L’arc pilote peut causer des brûlures – n’approchez pas le tube du chalumeau lorsque vous avez appuyé sur le gâchette.
- Portez des vêtements de protection adéquats qui recouvrent tout votre corps.
- Ne pointez pas le chalumeau en direction de votre corps ni de la pièce à couper lorsque vous appuyez sur la gâchette – l’arc pilote s’allume automatiquement.
- Mettez l’alimentation hors tension et débranchez le cordon d’alimentation avant de démonter le chalumeau ou de changer une pièce du chalumeau.
- Utilisez uniquement le ou les chalumeaux recommandés dans le manuel de l’opérateur.



LES BOUTEILLES peuvent exploser si elles sont endommagées.

Les bouteilles de gaz contiennent du gaz sous haute pression. Si une bouteille est endommagée, elle peut exploser. Puisque les bouteilles de gaz font habituellement partie d’un processus de travail des métaux, assurez–vous de les manipuler correctement.

- Protégez les bouteilles de gaz comprimé contre la chaleur excessive, les chocs mécaniques, le laitier, la flamme, les étincelles et l’arc.
- Installez et attachez les bouteilles dans la position verticale à l’aide d’une chaîne, sur un support stationnaire ou un châssis porte–bouteille afin de prévenir qu’elles ne tombent ou ne basculent.
- Les bouteilles ne doivent pas être près de la zone de coupage ni de tout autre circuit électrique.
- Un contact électrique ne doit jamais se produire entre un chalumeau de plasma d’arc et une bouteille.
- Ne coupez jamais sur une bouteille pressurisée – une explosion en résulterait.
- Utilisez uniquement des bouteilles de gaz, des détendeurs, des boyaux et des raccords conçus pour l’application déterminée. Gardez–les, ainsi que toute autre pièce associée, en bonne condition.
- Détournez votre visage du détendeur–régulateur lorsque vous ouvrez la soupape de la bouteille.
- Le couvercle du détendeur doit toujours être en place, sauf lorsque vous utilisez la bouteille ou qu’elle est reliée pour usage ultérieur.
- Lisez et suivez les instructions sur les bouteilles de gaz comprimé, l’équipement connexe et le dépliant P–1 de la CGA mentionné dans les Principales normes de sécurité.

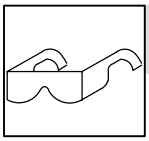
1-3. Dangers supplémentaires en relation avec l'installation, le fonctionnement et la maintenance

DES PIECES CHAUDES peuvent provoquer des brûlures graves.

- Ne pas toucher des parties chaudes à mains nues.
- Laisser refroidir avant d'intervenir sur la torche.

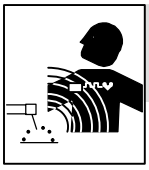
DES ORGANES MOBILES peuvent provoquer des blessures.

- S'abstenir de toucher des organes mobiles tels que des ventilateurs.
- Maintenir fermés et verrouillés les portes, panneaux, recouvrements et dispositifs de protection.



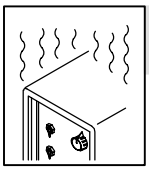
DES PARTICULES VOLANTES peuvent blesser les yeux.

- Porter des lunettes de sécurité avec protections latérales ou frontales.



LES CHAMPS MAGNÉTIQUES peuvent affecter les stimulateurs cardiaques.

- Porteurs de stimulateur cardiaque, restez à distance.
- Les porteurs sont priés de consulter leur médecin avant d'approcher les opérations de coupage plasma.



L'EMPLOI EXCESSIF peut SURCHAUFFER L'ÉQUIPEMENT.

- Prévoir une période de refroidissement; respecter le cycle opératoire nominal.
- Réduire l'ampérage (épaisseur) avant de continuer à couper ou réduire le facteur de marche.

Danger D'EXPLOSION D'HYDROGÈNE.

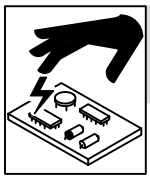
- Lors du coupage d'aluminium partiellement ou totalement immergé dans l'eau, de l'hydrogène libre peut s'accumuler sous la pièce.
- Consultez votre ingénieur de coupage et les instructions de la table de coupage.

LA CHUTE DE L'APPAREIL peut blesser.

- Utiliser l'anneau de levage uniquement pour soulever l'appareil, NON PAS les chariot, les bouteilles de gaz ou tout autre accessoire.
- Utiliser un engin d'une capacité appropriée pour soulever l'appareil.
- En utilisant des fourches de levage pour déplacer l'unité, s'assurer que les fourches sont suffisamment longues pour dépasser du côté opposé de l'appareil.

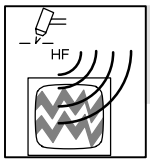
Risque D'INCENDIE OU D'EXPLOSION.

- Ne pas placer l'appareil sur, au-dessus ou à proximité de surfaces infllammables.
- Ne pas installer l'appareil à proximité de produits inflammables
- Ne pas surcharger l'installation électrique – s'assurer que l'alimentation est correctement dimensionné et protégé avant de mettre l'appareil en service.



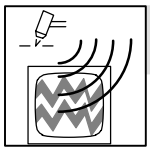
LES CHARGES ÉLECTROSTATIQUES peuvent endommager les circuits imprimés.

- Etablir la connexion avec la barrette de terre avant de manipuler des cartes ou des pièces.
- Utiliser des pochettes et des boîtes antistatiques pour stocker, déplacer ou expédier des cartes PC.



LE RAYONNEMENT HAUTE FRÉQUENCE (H.F.) risque de provoquer des interférences.

- Le Rayonnement haute frequence (H.F.) peut provoquer des interférences avec les équipements de radio–navigation et de communication, les services de sécurité et les ordinateurs.
- Demander seulement à des personnes qualifiées familiarisées avec des équipements électroniques de faire fonctionner l'installation.
- L'utilisateur est tenu de faire corriger rapidement par un électricien qualifié les interférences résultant de l'installation.
- Si le FCC signale des interférences, arrêter immédiatement l'appareil.
- Effectuer régulièrement le contrôle et l'entretien de l'installation.
- Maintenir soigneusement fermés les portes et les panneaux des sources de haute fréquence, maintenir les éclateurs à une distance correcte et utiliser une terre et et un blindage pour réduire les interférences éventuelles.



LE COUPAGE Ã L'ARC peut causer des interférence.

- L'énergie électromagnétique peut gêner le fonctionnement d'appareils électroniques comme des ordinateurs et des robots.
- Pour réduire la possibilité d'interférence, maintenir les câbles aussi courts que possible, les grouper, et les poser aussi bas que possible (ex. par terre).
- Veiller à couper à une distance de 100 mètres de tout équipement électronique sensible.
- S'assurer que la source de coupage est correctement branchée et mise à la terre.
- Si l'interférence persiste, l'utilisateur doit prendre des mesures supplémentaires comme écarter la machine, utiliser des câbles blindés de des filtres, ou boucler la zone de travail.

1-4. Principales normes de sécurité

Safety in Welding and Cutting, norme ANSI Z49.1, de l'American Welding Society, 550 N.W. Lejeune Rd, Miami FL 33126

Safety and Health Sandards, OSHA 29 CFR 1910, du Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Recommended Safe Practice for the Preparation for Welding and Cutting of Containers That Have Held Hazardous Substances, norme AWS F4.1, de l'American Welding Society, 550 N.W. Lejeune Rd, Miami FL 33126

National Electrical Code, NFPA Standard 70, de la National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

Safe Handling of Compressed Gases in Cylinders, CGA Pamphlet P-1, de la Compressed Gas Association, 1235 Jefferson Davis Highway, Suite 501, Arlington, VA 22202.

Règles de sécurité en soudage, coupage et procédés connexes, norme CSA W117.2, de l'Association canadienne de normalisation, vente de normes, 178 Rexdale Boulevard, Rexdale (Ontario) Canada M9W 1R3.

Safe Practices For Occupation And Educational Eye And Face Protection, norme ANSI Z87.1, de l'American National Standards Institute, 1430 Broadway, New York, NY 10018.

Cutting and Welding Processes, norme NFPA 51B, de la National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

1-5. Information sur les champs électromagnétiques

Données sur le soudage électrique et sur les effets, pour l'organisme, des champs magnétiques basse fréquence

Le courant de soudage ou de coupage passant dans les câbles de puissance crée des causera des champs électromagnétiques. Il y a eu et il y a encore un certain souci à propos de tels champs. Cependant, après avoir examiné plus de 500 études qui ont été faites pendant une période de recherche de 17 ans, un comité spécial ruban bleu du National Research Council a conclu: "L'accumulation de preuves, suivant le jugement du comité, n'a pas démontré que l'exposition aux champs magnétiques et champs électriques à haute fréquence représente un risque à la santé humaine". Toutefois, des études sont toujours en cours et les preuves continuent à être examinées. En attendant que les conclusions finales de la recherche soient établies, il vous serait souhaitable de réduire votre exposition aux champs électromagnétiques pendant le soudage ou le coupage.

Afin de réduire les champs électromagnétiques dans l'environnement de travail, respecter les consignes suivantes :

1 Garder les câbles ensembles en les torsadant ou en les attachant avec du ruban adhésif.

2 Mettre tous les câbles du côté opposé de l'opérateur.

3 Ne pas courber pas et ne pas entourer pas les câbles autour de vous.

4 Garder le poste de soudage et les câbles le plus loin possible de vous.

5 Relier la pince de masse le plus près possible de la zone de soudure.

Consignes relatives aux stimulateurs cardiaques :

Les consignes mentionnées précédemment font partie de celles destinées aux personnes ayant recours à un stimulateur cardiaque. Veuillez consulter votre médecin pour obtenir plus de détails.

SECTION 2 – DEFINITIONS

2-1. Warning Label Definitions

Warning! Watch Out! There are possible hazards as shown by the symbols.

1 Cutting sparks can cause explosion or fire.

1.1 Keep flammables away from cutting. Do not cut near flammables.

1.2 Cutting sparks can cause fires. Have a fire extinguisher nearby, and have a watchperson ready to use it.

1.3 Do not cut on drums or any closed containers.

2 The plasma arc can cause injury and burns.

2.1 Turn off power before disassembling torch.

2.2 Do not grip material near cutting path.

2.3 Wear complete body protection.

3 Electric shock from torch or wiring can kill.

3.1 Wear dry insulating gloves. Do not wear wet or damaged gloves.

3.2 Protect yourself from electric shock by insulating yourself from work and ground.

3.3 Disconnect input plug or power before working on machine.

4 Breathing cutting fumes can be hazardous to your health.

4.1 Keep your head out of the fumes.

4.2 Use forced ventilation or local exhaust to remove the fumes.

4.3 Use ventilating fan to remove fumes.

5 Arc rays can burn eyes and injure skin.

5.1 Wear hat and safety glasses. Use ear protection and button shirt collar. Use welding helmet with correct shade of filter. Wear complete body protection.

6 Become trained and read the instructions before working on the machine or cutting.

7 Do not remove or paint over (cover) the label.

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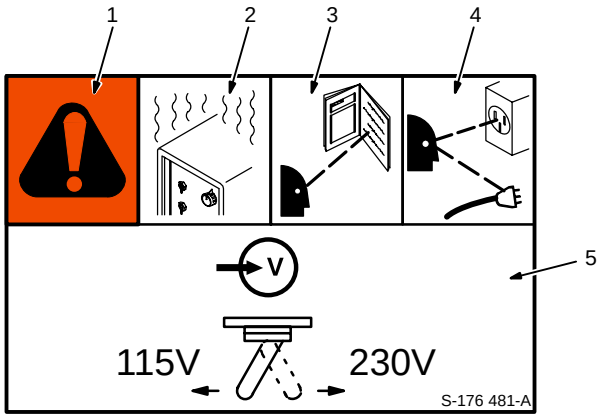

1 Warning! Watch Out! There are possible hazards as shown by the symbols.

2 Incorrect voltage other than specified may damage unit (see Section 3-8).

3 Read Owner's Manual.

4 Look at input power receptacle and plug, and be sure they match.

5 Move switch to match input voltage.

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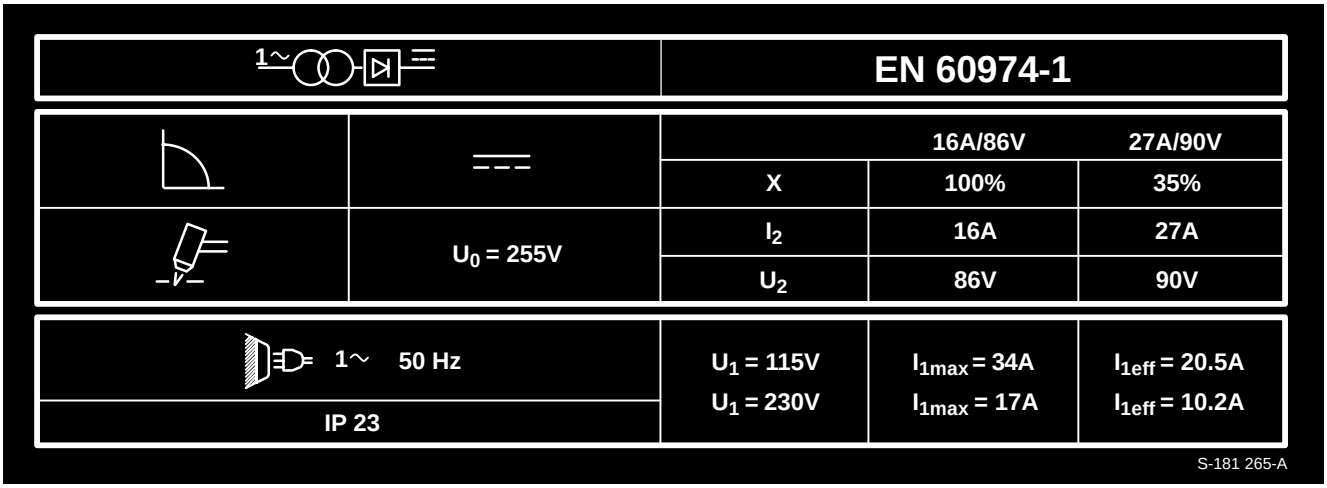
2-2. Manufacturer's Rating Label For CE Products



2-3. Symbols And Definitions

A	Amperes		Plasma Arc Cutting (PAC)		Adjust Air/Gas Pressure		Low Air Pressure Light
V	Volts		Increase		No – Do Not Do This		Temperature
	Protective Earth (Ground)	1	Single Phase		Constant Current	V	Voltage Input
I	On	O	Off	%	Percent		Direct Current
U_0	Rated No Load Voltage (Average)	U_1	Primary Voltage	U_2	Conventional Load Voltage		Line Connection
I_{1max}	Rated Maximum Supply Current	I_2	Rated Welding Current	X	Duty Cycle		Single Phase Static Frequency Converter-Transformer-Rectifier
IP	Degree Of Protection		Loose Shield Cup		Input	Hz	Hertz
I_{1eff}	Maximum Effective Supply Current						

SECTION 3 – INSTALLATION

3-1. Specifications For Units Connected to a 20 Ampere, 115 Volt Circuit or a 10 Ampere, 230 Volt Circuit

Rated Output	Amperes Input at Rated Output, 60 Hz, Single-Phase		115 V KVA/KW	230 V KVA/KW	Plasma Gas	Plasma Gas Flow/ Pressure	Rated Cutting Capacity at 10 IPM	Max OCV
	115 V	230 V						
21 A at 88 Volts DC At 35% Duty Cycle	25.3 max; 15 eff	12.6 max; 7.5 eff	2.9 KVA 2.2 KW	2.9 KVA 2.2 KW	Air Or Nitrogen Only	4.5 CFM (129 L/min) At 60 PSI (414 kPa)	115 VAC Input: 1/4 in (6 mm); 230 VAC Input: 5/16 in (8 mm)	265 Volts DC

3-2. Specifications For Units Connected to a 30 Ampere, 115 Volt Circuit or a 15 Ampere, 230 Volt Circuit

NOTE ☞

If the unit is operated from a 30 ampere, 115 volt circuit or a 15 ampere, 230 volt circuit, a different input power plug must be installed on the power cord. See Section 3-9 for instructions.

Rated Output	Amperes Input at Rated Output, 60 Hz, Single-Phase		115 V KVA/KW	230 V KVA/KW	Plasma Gas	Plasma Gas Flow/ Pressure	Rated Cutting Capacity at 10 IPM	Max OCV
	115 V	230 V						
27 A at 91 Volts DC At 35% Duty Cycle	33.6 max; 19.9 eff	16.8 max; 9.9 eff	3.8 KVA 3.1 KW	3.8 KVA 3.1 KW	Air Or Nitrogen Only	4.5 CFM (129 L/min) At 60 PSI (414 kPa)	115 VAC Input: 1/4 in (6 mm); 230 VAC Input: 5/16 in (8 mm)	265 Volts DC
21 A at 88 Volts DC At 60% Duty Cycle	25.3 max; 19.6 eff	12.6 max; 9.8 eff	2.9 KVA 2.2 KW	2.9 KVA 2.2 KW				
17 A at 87 Volts DC At 100% Duty Cycle	20.9 max; 20.9 eff	10.5 max; 10.5 eff	2.4 KVA 1.8 KW	2.4 KVA 1.8 KW				

3-3. Specifications For CE Model

Rated Output	Amperes Input at Rated Output, 50 Hz, Single-Phase		KVA	KW	Plasma Gas	Plasma Gas Flow/ Pressure	Max OCV	IP Rating
	115 V	230 V						
115 VAC Input: 20 A @ 89 Volts DC (20 A Input Circuit); 25 A @ 89 Volts DC (30 A Input Circuit); 230 VAC Input: 25 A @ 89 Volts DC; 35% Duty Cycle In All Cases	26 (0.4*)	17 (0.2*)	115 VAC Input: 3.1 (0.05*) 230 VAC Input: 4.0 (0.05*)	115 VAC Input: 2.4 (0.04*) 230 VAC Input: 3.1 (0.04*)	Air Or Nitrogen Only	4.5 CFM (129 L/min) At 60 PSI (414 kPa)	265 Volts DC	23
*While idling								

3-4. Duty Cycle And Overheating For Non-CE Model

For Units Connected to a 20 Ampere, 115 Volt Circuit or a 10 Ampere, 230 Volt Circuit:

35% Duty Cycle At 21 Amperes, 88 volts dc

For Units Connected to a 30 Ampere, 115 Volt Circuit or a 15 Ampere, 230 Volt Circuit:

35% Duty Cycle At 27 Amperes, 91 volts dc

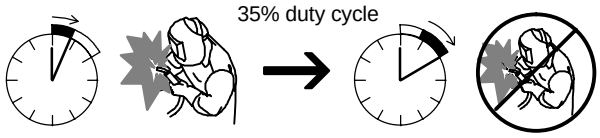
60% Duty Cycle At 21 Amperes, 88 volts dc

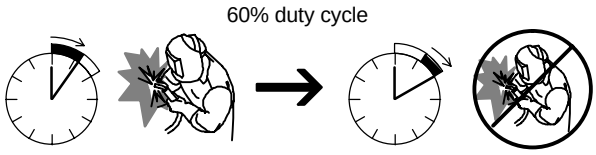
100% Duty Cycle At 17 Amperes, 87 volts dc

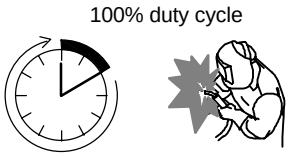
Duty Cycle is percentage of 10 minutes that unit can cut at rated load without overheating.

If unit overheats, thermostat(s) opens, output stops, Temperature trouble light goes On, and cooling fan runs. Wait fifteen minutes for unit to cool or temperature light to go off. Reduce amperage or duty cycle before cutting or gouging.

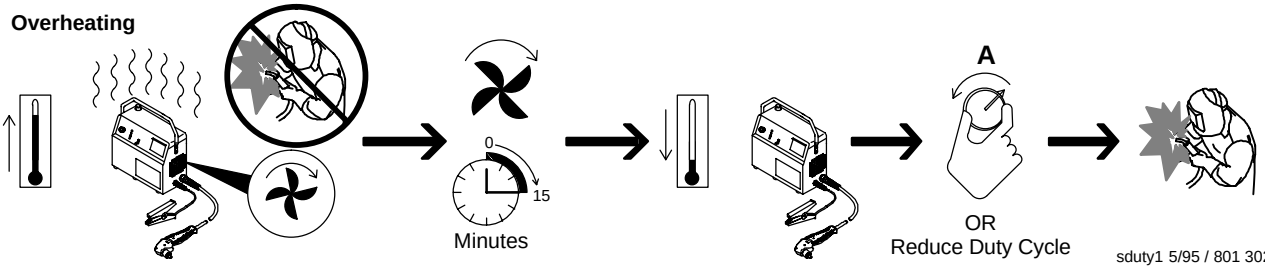
▲ **Exceeding duty cycle can damage unit and void warranty.**







Overheating



sduty1 5/95 / 801 302-C

3-5. Duty Cycle And Overheating For CE Model

115 VAC Input Power: 35% Duty Cycle At 20 Amperes, 20 Ampere Input Circuit

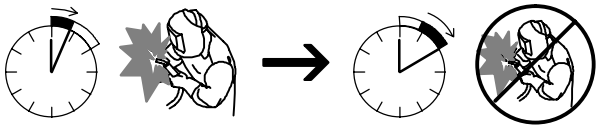
115 VAC Input Power: 35% Duty Cycle At 25 Amperes, 30 Ampere Input Circuit

230 VAC Input Power: 35% Duty Cycle At 25 Amperes

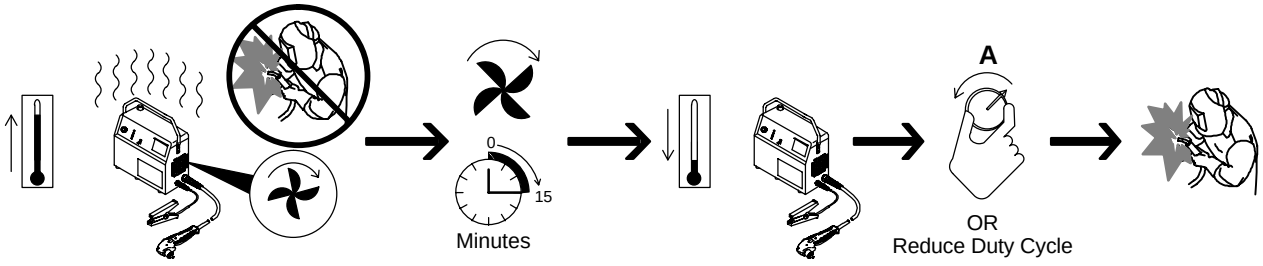
Duty Cycle is percentage of 10 minutes that unit can cut at rated load without overheating.

If unit overheats, thermostat(s) opens, output stops, Temperature trouble light goes On, and cooling fan runs. Wait fifteen minutes for unit to cool or temperature light to go off. Reduce amperage or duty cycle before cutting or gouging.

▲ **Exceeding duty cycle can damage unit and void warranty.**



Overheating

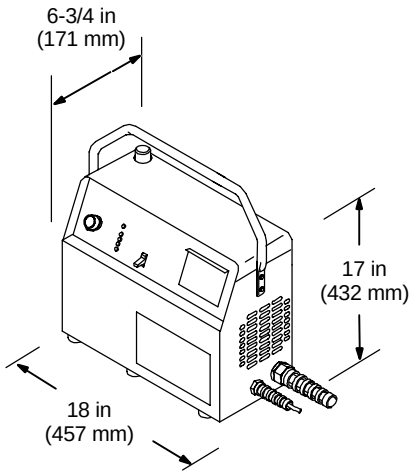


duty1 4/95 – 801 302-C

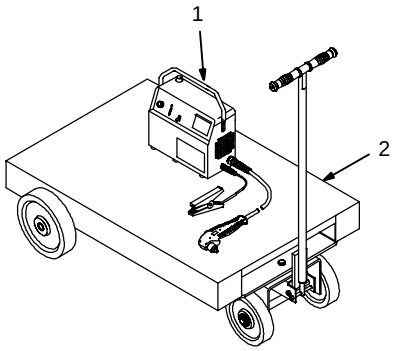
3-6. Selecting A Location

Dimensions And Weight

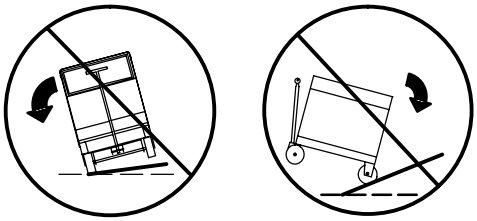
42 lb (19.1 kg)



Movement



▲ **Do not move or operate unit where it could tip.**



1 Lifting Handle

Use handle to lift unit.

2 Hand Cart

Use cart or similar device to move unit.

3 Plate Label

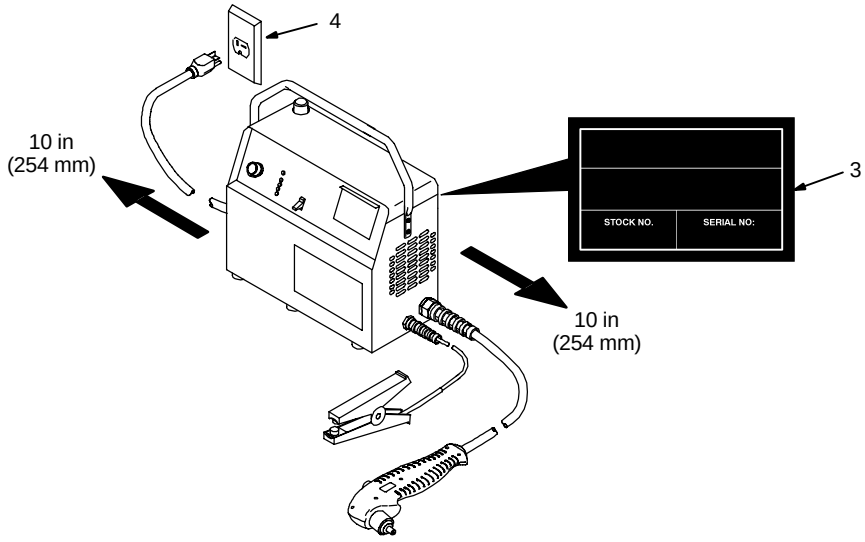
Use label to determine input power needs.

4 115 Or 230 VAC Receptacle

Locate unit near correct input power supply.

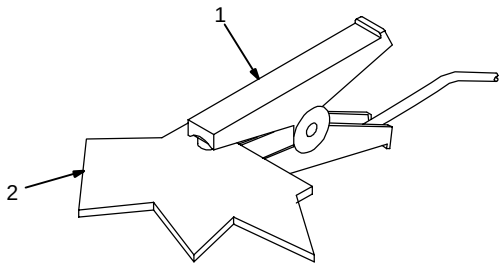
▲ **Special installation may be required where gasoline or volatile liquids are present – see NEC Article 511 or CEC Section 20.**

Location And Airflow



loc_2 3/96 - 801 303-C / 801 319-C

3-7. Connecting Work Clamp And Gas/Air Supply



1 Work Clamp

2 Workpiece

Connect work clamp to a clean, paint-free location on workpiece, as close to cutting area as possible.

☞ *Use only clean, dry air with 70 to 150 psi (483 to 1034 kPa) pressure.*

3 Air Filter/Regulator

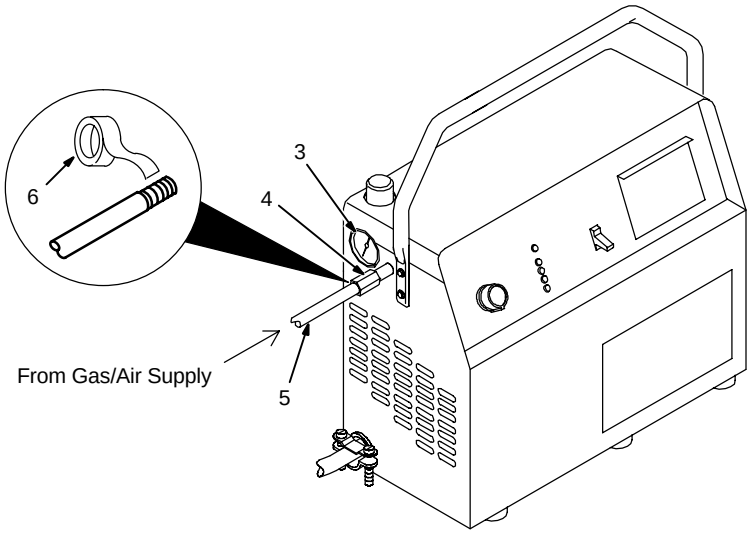
4 Gas/Air Inlet Opening

5 Hose

6 Teflon Tape

Obtain hose with 1/4 NPT right-hand thread fitting. Wrap threads with teflon tape (optional) or apply pipe sealant, and install fitting in opening. Route hose to gas/air supply.

Adjust gas/air pressure according to Section 4-1.

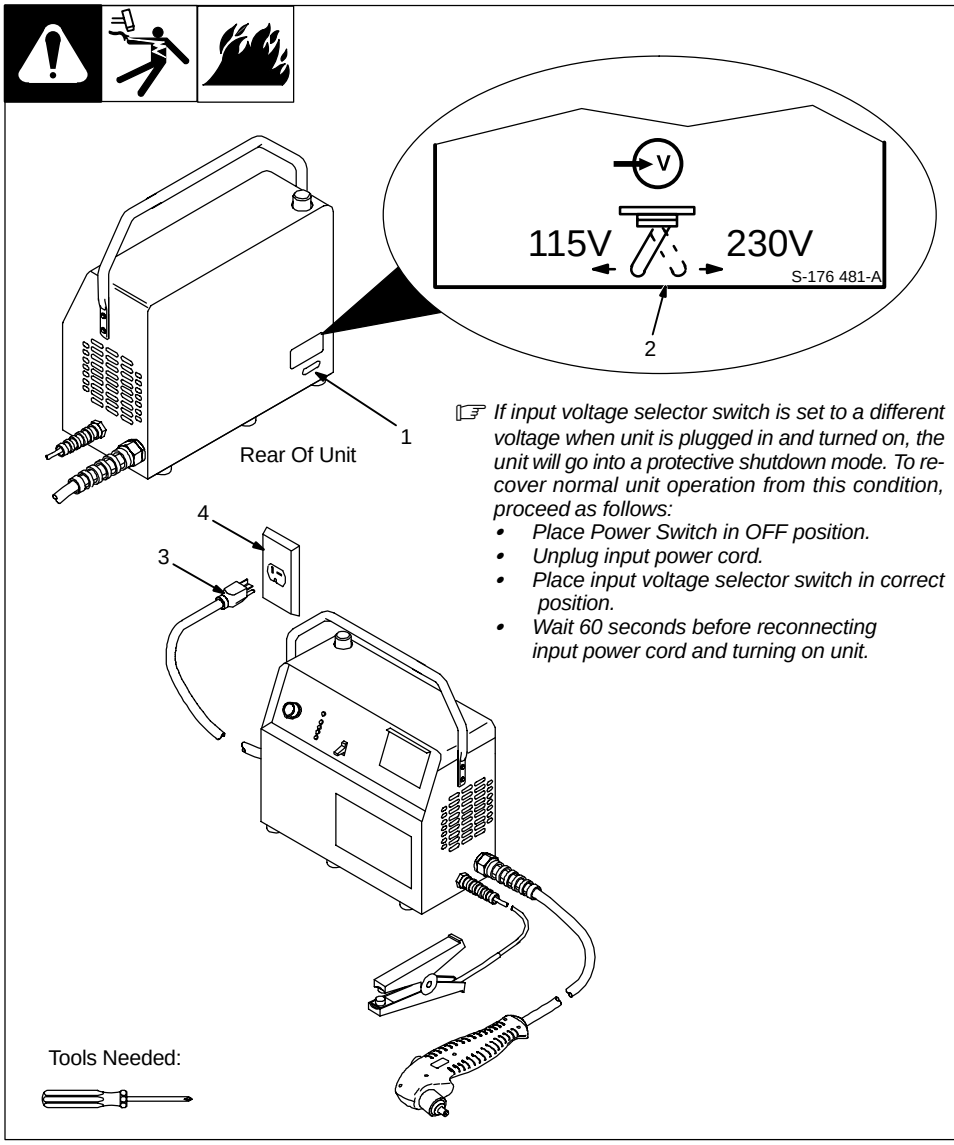


Tools Needed:

5/8, 1-1/8 in

Ref. 801 319-C / Ref. 801 306-C

3-8. Setting Input Voltage Selector Switch And Connecting Input Power



☞ *If input voltage selector switch is set to a different voltage when unit is plugged in and turned on, the unit will go into a protective shutdown mode. To recover normal unit operation from this condition, proceed as follows:*

- *Place Power Switch in OFF position.*
- *Unplug input power cord.*
- *Place input voltage selector switch in correct position.*
- *Wait 60 seconds before reconnecting input power cord and turning on unit.*

Tools Needed:

Check input voltage available at site.

1 Input Voltage Selector Switch

Switch is accessible through slot in rear panel.

2 Changeover Switch Label

Look at label to find correct switch position.

Move switch to match input voltage.

3 Supplied 115 VAC Plug

If plug does not match voltage at receptacle or type of receptacle, install suitable plug according to Section 3-9.

▲ **Be sure input power connection meets all applicable national, regional, and local electrical codes.**

4 115 Or 230 VAC Receptacle (115 VAC Shown)

▲ **To use rated output (see specifications), connect the unit to an individual branch circuit capable of carrying the effective (eff) current for the output being used. The unit must have a properly sized plug installed and the circuit must be protected by properly sized fuses or circuit breakers.**

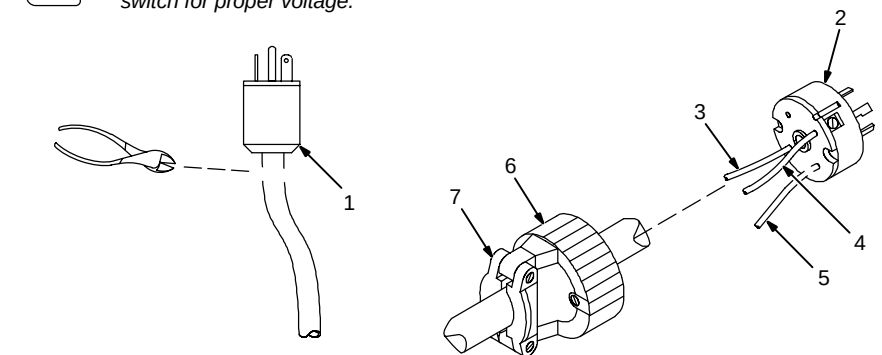
Connect plug to proper receptacle. Be sure receptacle can handle load.

801 304-C / 801 319-C

3-9. Installing Alternative Plug

☞ *This procedure is necessary if the unit is to be connected to a 230 VAC receptacle, or to a 115 VAC receptacle that requires a plug that is different from the supplied plug.*

☞ *See Section 3-8 for instructions on setting input voltage selector switch for proper voltage.*



Tools Needed:

1 Supplied 115 VAC Plug

Cut cord close to plug.

2 Alternative PLug (230 VAC Plug Shown)

3 Load 1 (Brass) Terminal

4 Load 2 (Brass) Terminal

5 Ground (Green) Terminal

6 Outer Shell

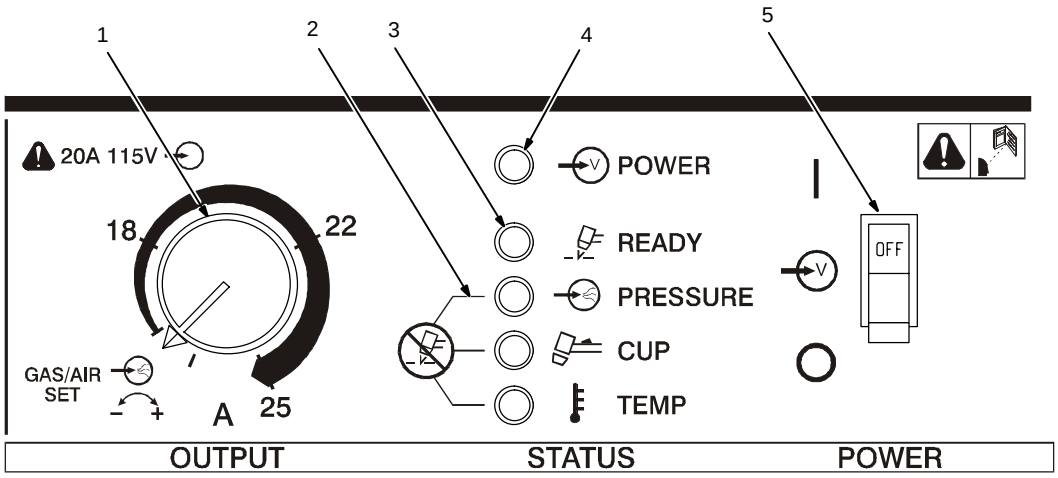
7 Cord Grip

Strip cord jacket back enough to separate conductors. Strip conductors enough to make good contact with plug terminals. Make plug connections and reinstall outer shell and cord grip. Tighten assembly screws onto shell. Do not overtighten.

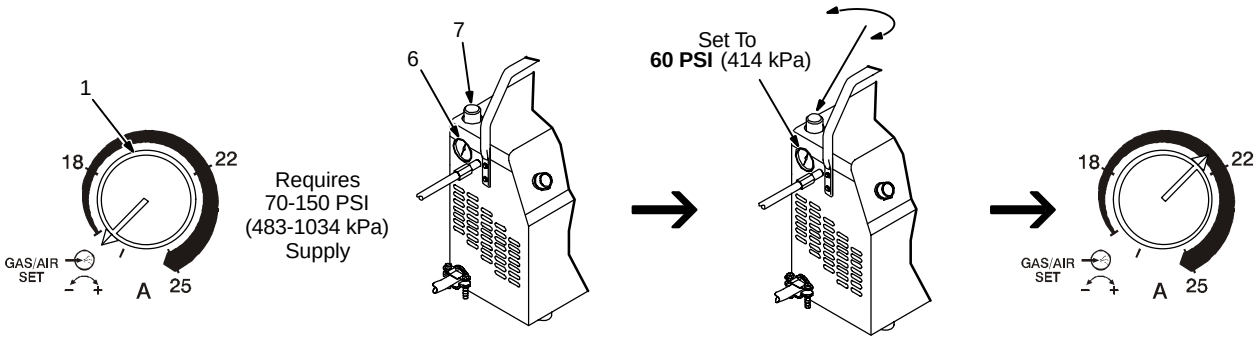
Ref. 801 305-A / 801 611

SECTION 4 – OPERATION

4-1. Controls



Setting Gas/Air Pressure



1 Output Control

Use control to set cutting output.

The yellow zone is for use on 20 A or greater primary circuits.

Place control in Gas/Air Set position to safely adjust gas/air pressure. Only gas/air circuit is activated.

If 20-25 amperes of cutting output is used with 115 VAC input power, and the overload protection on the input power circuit frequently opens, either reduce the cutting output and/or the cut time or find more adequate power (see Section 3-8).

2 Trouble Lights (See Section 5-2)

3 Ready Light

Use light to tell if unit is ready for operation.

Ready light comes on when Power switch is placed in On position, indicating that all safety shutdown systems are okay.

If Ready light does not come on, check Trouble Lights.

4 Power Light

5 Power Switch

Setting Gas/Air Pressure

6 Air Filter/Regulator

7 Pressure Adjustment Knob

Place Output control in Gas/Air position and turn on gas/air supply. Lift knob and turn to adjust pressure. Push knob down to lock in setting.

Place Output control in desired cutting output.

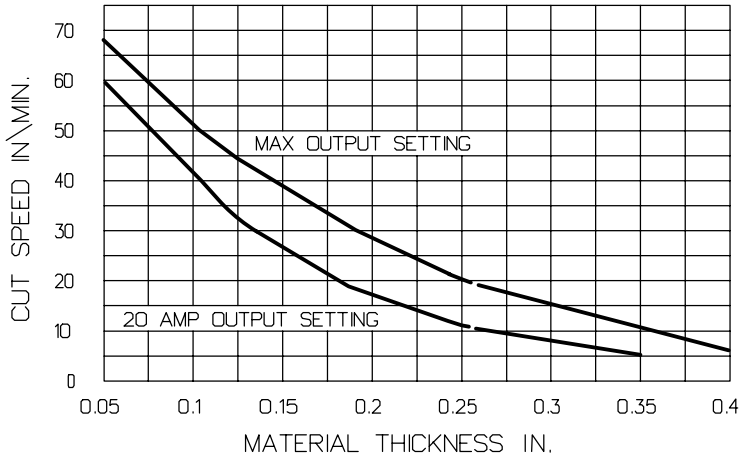
Ref. 801 306-C / Ref. 192 492

4-2. Cutting Speed

The cutting speed curves show the recommended maximum cutting speed capabilities of the power source and torch for mild steel of various thickness.

Cut at speeds below the lines shown to avoid poor cuts and torch wear.

Recommended production cutting speed vs. material thickness is approximately 10 imp at 5/16 in mild steel thickness at max setting.



179 507

4-3. Sequence Of Operation

Do not clean torch by hitting it against a hard surface. Hitting hard surfaces can damage torch parts and stop proper operation.

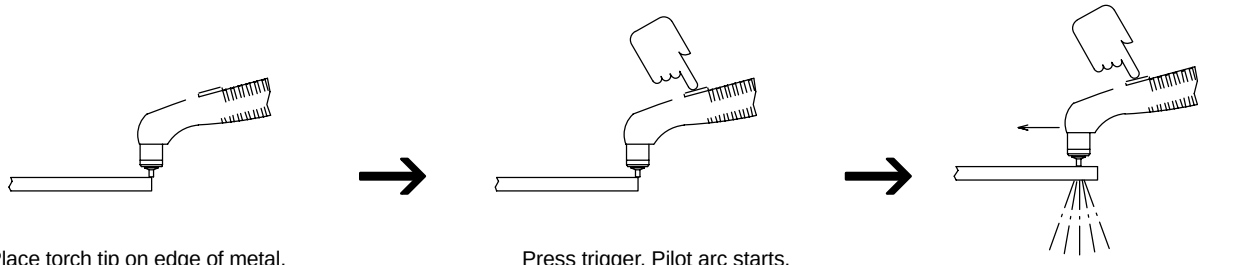
Inspect shield cup, tip, and electrode for wear before cutting or whenever cutting speed has been significantly reduced (see torch Owner's Manual). Do not operate torch without a tip or electrode in place.

Install & Connect Equipment → Put On Personal Safety Equipment → Check Torch (See Torch Owner's Manual) → Check Gas/Air Pressure (See Section 4-1) → Set Controls → Turn On Power Source → Begin Cutting

---

EXAMPLE Of Cutting Operation

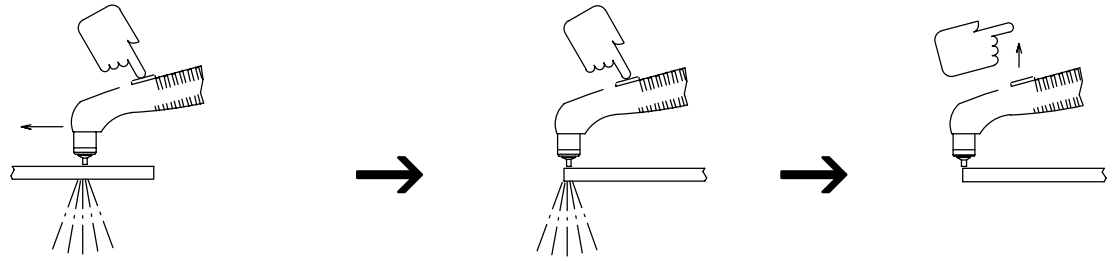
The pilot arc starts immediately when trigger is pressed.



Place torch tip on edge of metal.

Press trigger. Pilot arc starts.

After cutting arc starts, slowly start moving torch across metal.



Adjust torch speed so sparks go thru metal and out bottom of cut.

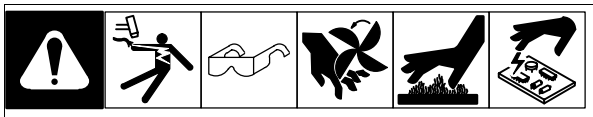
Pause briefly at end of cut before releasing trigger.

Postflow continues for approx. 20 to 30 seconds after releasing trigger; cutting arc can be instantly restarted during postflow by pressing trigger.

161 698-B

SECTION 5 – MAINTENANCE & TROUBLESHOOTING

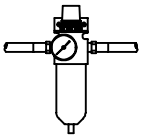
5-1. Routine Maintenance



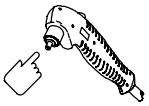
▲ **Disconnect power before maintaining.**

☞ *Maintain more often during severe conditions.*

Each Use

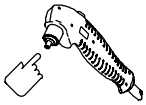


Check Gas/Air Pressure



Check Torch Tip, Electrode, And Shield Cup

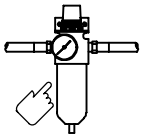
Every Week



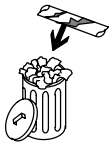
Check Shield Cup Shutdown System

3 Months

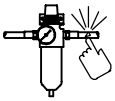
Replace Damaged Or Unreadable Labels



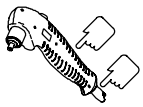
Service Air Filter/ Regulator



Replace Cracked Parts



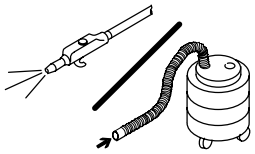
Gas/Air Hose



Torch Body, Cable

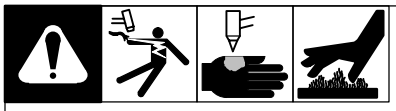
Tape Torn Outer Covering

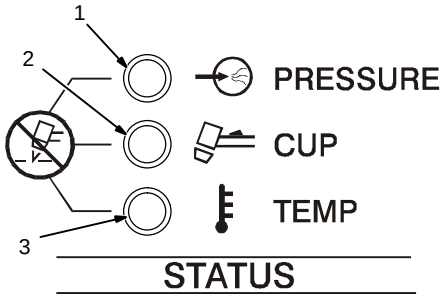
6 Months



Blow Out Or Vacuum Inside

5-2. Overload Protection: Trouble Lights & Checking Shield Cup Shutdown System





If certain problems occur, the Ready light goes off, a trouble light comes on, and output stops.

1 Pressure Light

Lights if gas/air pressure is below 40 PSI (276 kPa).

Turn power Off, and check for proper gas/air pressure (see Section 4-1).

2 Cup Light

Lights if shield cup is loose.

Turn power Off, and check shield cup connection (see torch Owner's Manual). Power must be reset whenever the cup shutdown is activated.

Check shield cup shutdown system once a week.

3 Temperature Light

Lights if power source overheats (see Section 3-5).

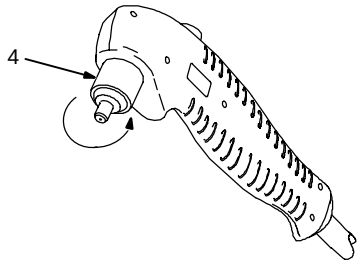
4 Torch Shield Cup

Turn Power On and loosen shield cup. If shutdown system works properly, Ready light goes off and Cup light comes on. If not, turn power Off and check for proper gas/air pressure (see Section 4-1), blocked or leaking hose, or loose shield cup (see torch Owner's Manual).

If system works properly, retighten cup and reset power.

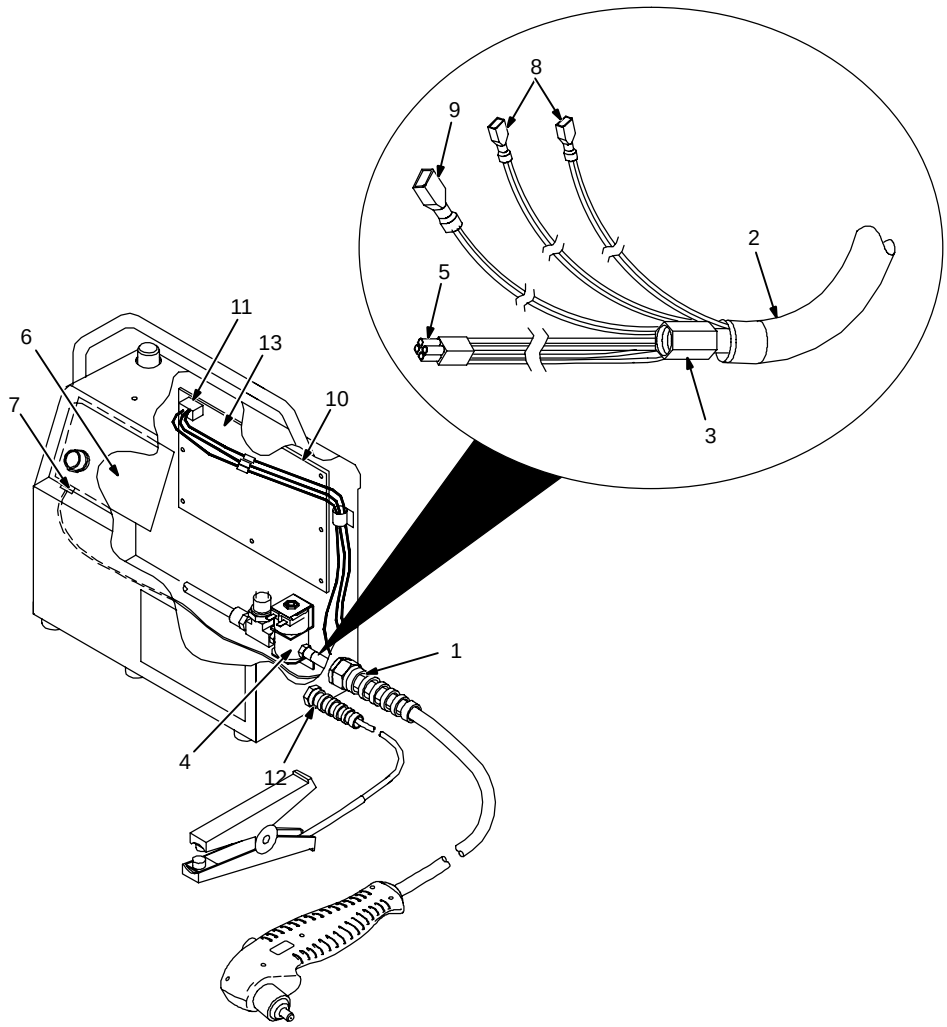
Checking Torch Shield Cup Shutdown System

Power must be reset whenever the cup shutdown system is activated. ***Always turn Off power when changing or checking consumables.***



Ref. 192 492 / Ref. 801 300-A

5-3. Torch And Work Cable Connections



If torch or work cable needs to be removed or replaced, proceed as follows:

Turn power Off, and disconnect input power plug from receptacle. Remove top and screws holding front panel in place. Without disconnecting any plugs, move front panel to allow access.

Torch Connections

1 Strain Relief Clamp

2 Torch Cable

Insert cable through strain relief clamp.

3 Gas Connector

4 Gas Valve

Install gas connector onto gas valve.

5 Plug PLG18

6 Safety Control Board PC2

7 Receptacle RC18

Connect PLG18 to RC18. Route leads along existing lead bundle.

8 Female Friction Terminals

9 Male Friction Terminal

10 Power Control Board PC1

11 Receptacle RC4

Connect female terminals to leads 23 and 24 from RC4 (connect to either lead). Connect male terminal to lead 25 from RC4. Route leads as shown.

Work Cable Connections

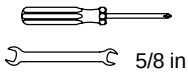
12 Strain Relief Clamp

Insert work clamp lead through strain relief clamp.

13 Receptacle RC6

Connect work clamp lead to lead 20 from RC6 (leads not shown). Route leads along existing lead bundle.

Tools Needed:

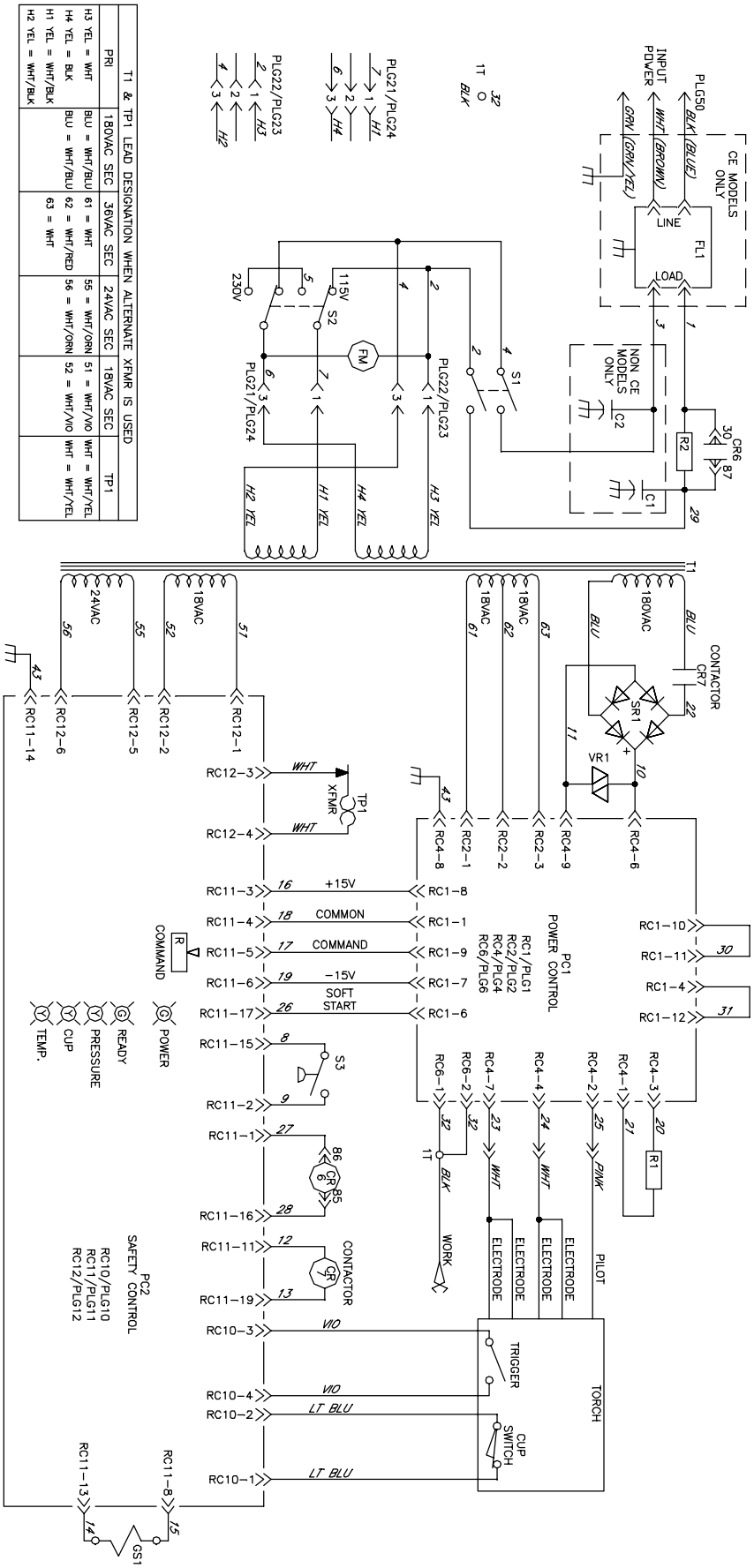


801 423-A / Ref. 801 300-B

5-4. Troubleshooting

Trouble	Remedy
No pilot arc; difficulty in establishing an arc.	Clean or replace worn consumables as necessary (see torch Owner's Manual).
	Check for damaged torch or torch cable (see torch Owner's Manual).
	Have Factory Authorized Service Agent check control relay CR6, power control board PC1, safety control board PC2, gas valve GS1, rectifier SR1, and check gas/air system for leaks.
No cutting output; Power light off; Trouble lights off; Ready light off; fan motor FM does not run.	Place Power switch in On position.
	Place line disconnect device in On position (see Section 3-8).
	Check line fuse(s) and replace if needed or reset circuit breakers (see Section 3-8).
	Have Factory Authorized Service Agent check power switch S1, input voltage selector switch S2, input resistor R2, control relay CR6, safety control board PC2, and transformer T1.
No cutting output; Power light on; Ready light on; Trouble lights off; fan motor FM running.	Be sure work clamp is connected.
	Clean or replace worn consumables as necessary (see torch Owner's Manual).
	Have Factory Authorized Service Agent check contactor W, control relay CR3, and safety control board PC2.
No cutting output; Power light on; Ready light off; Trouble lights off; fan motor FM running.	Reset Power switch.
	Have Factory Authorized Service Agent check contactor CR7, control relay CR6, safety control board PC2, input resistor R2, power control board PC1. Check for proper torch lead connections. Check operation of gas valve GS1, and check gas/air system for leaks.
No control of output.	Check position of input voltage selector switch S2 (see Section 3-8).
	Have Factory Authorized Service Agent check power control board PC1, and safety control board PC2.
No gas/air flow; Power light on; Ready light on; Trouble lights off; fan motor FM running.	Have Factory Authorized Service Agent check for proper torch connections, and check power control board PC1. Check operation of gas valve GS1, and check gas/air system for leaks.
Pressure Trouble light On; Ready light off.	Check for correct gas/air pressure adjustment (see Section 4-1).
	Check for sufficient gas/air supply pressure (see Section 3-7).
	Check for dirty air filter/regulator and clean, if needed (see manufacturer's instructions).
Cup Trouble light On; Ready light off.	Check torch shield cup (see Section 5-2).
	Have Factory Authorized Service Agent check for proper torch connections, and check safety control board PC2.
Temperature Trouble light On; Ready light off.	Thermostat TP1 open (overheating). Allow fan to run; the thermostat closes when the unit has cooled (see Section 3-5).
	Have Factory Authorized Service Agent check safety control board PC2 and transformer T1.
Fan motor FM does not run; Power light and Ready light both On.	Have Factory Authorized Service Agent check fan motor connections.
Trouble lights not working.	Have Factory Authorized Service Agent check safety control board PC2.

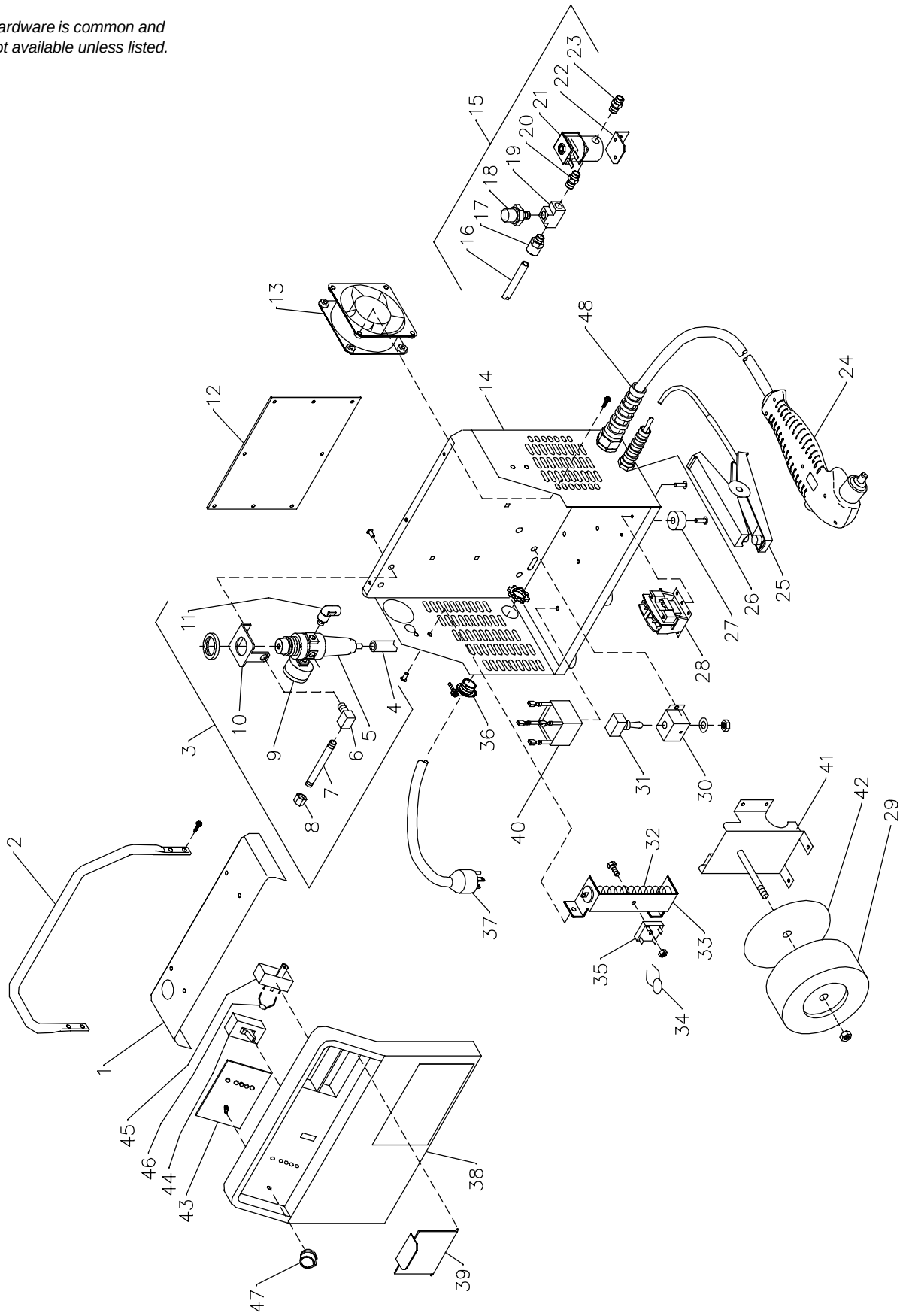
SECTION 6 – ELECTRICAL DIAGRAM



SC-189 005-A

Figure 6-1. Circuit Diagram For Power Source

☞ *Hardware is common and not available unless listed.*



ST-801 412-H

Figure 7-1. Main Assembly

Item No.	Dia. Mkgs.	Part No.	Description	Quantity

Figure 7-1. Main Assembly

1		183 161	COVER, top	1
2		175 145	HANDLE, lifting	1
3		175 366	REGULATOR ASSEMBLY, (consisting of)	1
4		188 961	HOSE, PVC .312 ID x .437 OD x 7.375	1
5		174 668	REGULATOR/FILTER, 250 PSIG in 100 PSIG max out	1
6		176 518	FITTING, pipe brs elbow st 1/4NPT	1
7		176 517	FITTING, pipe brs nipple L 1/4NPT x 2.500	1
8		602 963	FITTING, pipe brs coupling 1/4NPT	1
		118 134	FITTING, pipe brs plug shhd 1/4NPT	1
9		174 783	GAUGE, pressure air 0-160 PSI 1/8NPT	1
10		174 562	BRACKET, mtg air filter/regulator	1
11		176 123	FITTING, plstc Qdisc elbow 1/4NPT x 1/4 OD tubing	1
		181 693	GASKET, neoprene	1
12	PC1	189 735	CIRCUIT CARD ASSEMBLY, power control	1
	PLG1	158 720	CONNECTOR & SOCKETS	1
	PLG4	168 071	CONNECTOR & SOCKETS	1
	PLG6	176 121	CONNECTOR, rect 1 row plug	1
		114 066	CONNECTOR, rect skt 20-14ga	1
		134 201	STAND-OFF SUPPORT, PC card	3
		070 026	STAND-OFF, 6-32 x .437 lg	4
13	FM	195 610	FAN, muffin 115V 50/60 Hz 3100RPM	1
14		183 162	CASE, base/back/sides	1
15		175 365	AIR VALVE ASSEMBLY, (consisting of)	1
16		177 346	TUBING, pneumatic .250 OD x .170 ID x 13.500	1
17		176 122	FITTING, plstc Qdisc straight 1/8NPT x 1/4 OD	1
18	S3	174 670	SWITCH, pressure air 40PSI fixed	1
19		602 965	FITTING, pipe brs tee 1/8NPT	1
20		073 655	FITTING, pipe brs nipple hex 1/8NPT	1
21	GS1	175 827	VALVE, 24VAC 3 way 1/8NPT 5/32 orf 100PSI	1
22		157 057	BRACKET, valve	1
23		175 998	FITTING, pipe brs adaptor 1/8NPT/.375-24 LH	1
24		176 499	ICE-25C PLASMA ARC CUTTING TORCH, 15ft (see OM-1593)	1
24		♦176 822	ICE-25C PLASMA ARC CUTTING TORCH, 25ft (see OM-1593)	1
25		199 021	CABLE, work 15ft	1
		199 995	CONTACT TIP, work clamp	2
		072 253	STUD, connection	1
26		020 577	BUSHING, strain relief .120/.150 ID x .500mtg	1
27		019 663	MOUNT, nprn	6
28	CR7	175 828	CONTACTOR, def prp 25A 1P 24VAC	1
29	T1	187 960	TRANSFORMER, main power 115/230 60Hz	1
29	T1	191 846	TRANSFORMER, main power 115/230 50/60Hz (CE model)	1
30		185 473	BRACKET, switch	1
31	S2	011 611	SWITCH, toggle DPDT 15A 125VAC	1
	PLG21	136 810	CONNECTOR & SOCKETS	1
32	R1	176 505	RESISTOR, WW fxd 338W 1.5 ohm	1
33		175 058	BRACKET, resistor	1
34	VR1	178 393	VARISTOR	1
35	SR1	179 682	RECTIFIER, integ 40A 800V	1
		141 690	GROMMET	2
36		010 916	CONNECTOR, clamp cable	1
37		181 269	CABLE, power 10ft 14ga 3/C	1
37		181 467	CABLE, power 10ft 14ga 3/C (CE model)	1

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
			Figure 7-1. Main Assembly (Continued)	
38		+181 717	FRONT PANEL, (consisting of)	1
			NAMEPLATE, (order by model and serial number)	1
		184 544	LINER, polycarbonate lens	1
		178 956	MAGNET, adhesive mounted	1
		136 156	LABEL, warning precautionary	1
		183 805	LABEL, warning precautionary (CE model)	1
		179 190	LABEL, warning shock	1
39		181 716	DOOR, consumable storage	1
40	FL1	181 262	FILTER, common mode 25A (CE model)	1
41		175 144	BRACKET, transformer	1
42		188 116	INSULATOR, toroid	1
43	PC2	192 790	CIRCUIT CARD ASSEMBLY, safety control	1
	PLG11	169 240	CONNECTOR & SOCKETS	1
44	S1	124 511	SWITCH, toggle DPST 40A 600VAC	1
		181 708	GASKET, switch	1
	PLG20,22	167 640	CONNECTOR & SOCKETS	2
45	CR6	149 823	RELAY, encl 12VDC SPST	1
46	R2	178 587	RESISTOR, WW fxd 5W 10 ohm	1
47		174 991	KNOB, pointer	1
48		121 276	BUSHING, strain relief	1

+When ordering a component originally displaying a precautionary label, the label should also be ordered.

♦Optional

To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.

Warranty Questions?

Call
1-800-4-A-MILLER
for your local
Miller distributor.

Your distributor also gives you ...

Service
You always get the fast, reliable response you need. Most replacement parts can be in your hands in 24 hours.

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Need fast answers to the tough welding questions? Contact your distributor. The expertise of the distributor and Miller is there to help you, every step of the way.

Miller
The Power of Blue.

TRUE BLUE® WARRANTY

Effective January 1, 2000
(Equipment with a serial number preface of "LA" or newer)

This limited warranty supersedes all previous Miller warranties and is exclusive with no other guarantees or warranties expressed or implied.

LIMITED WARRANTY – Subject to the terms and conditions below, Miller Electric Mfg. Co., Appleton, Wisconsin, warrants to its original retail purchaser that new Miller equipment sold after the effective date of this limited warranty is free of defects in material and workmanship at the time it is shipped by Miller. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS.

Within the warranty periods listed below, Miller will repair or replace any warranted parts or components that fail due to such defects in material or workmanship. Miller must be notified in writing within thirty (30) days of such defect or failure, at which time Miller will provide instructions on the warranty claim procedures to be followed.

Miller shall honor warranty claims on warranted equipment listed below in the event of such a failure within the warranty time periods. All warranty time periods start on the date that the equipment was delivered to the original retail purchaser, or one year after the equipment is sent to a North American distributor or eighteen months after the equipment is sent to an International distributor.

1. 5 Years Parts – 3 Years Labor
   * Original main power rectifiers
   * Inverters (input and output rectifiers only)
2. 3 Years — Parts and Labor
   * Transformer/Rectifier Power Sources
   * Plasma Arc Cutting Power Sources
   * Semi-Automatic and Automatic Wire Feeders
   * Inverter Power Supplies
   * Intellitig
   * Engine Driven Welding Generators **(NOTE: Engines are warranted separately by the engine manufacturer.)**
3. 1 Year — Parts and Labor
   * DS-2 Wire Feeder
   * Motor Driven Guns (w/exception of Spoolmate 185 & Spoolmate 250)
   * Process Controllers
   * Positioners and Controllers
   * Automatic Motion Devices
   * RFCS Foot Controls
   * Induction Heating Power Sources
   * Water Coolant Systems
   * HF Units
   * Grids
   * Maxstar 140
   * Spot Welders
   * Load Banks
   * Miller Cyclomatic Equipment
   * Running Gear/Trailers
   * Plasma Cutting Torches (except APT & SAF Models)
   * Field Options
     (NOTE: Field options are covered under True Blue® for the remaining warranty period of the product they are installed in, or for a minimum of one year — whichever is greater.)
4. 6 Months — Batteries
5. 90 Days — Parts
   * MIG Guns/TIG Torches
   * Induction Heating Coils and Blankets
   * APT, ZIPCUT & PLAZCUT Model Plasma Cutting Torches
   * Remote Controls
   * Accessory Kits
   * Replacement Parts (No labor)
   * Spoolmate 185 & Spoolmate 250
   * Canvas Covers

Miller's True Blue® Limited Warranty shall not apply to:

1. **Consumable components; such as contact tips, cutting nozzles, contactors, brushes, slip rings, relays or parts that fail due to normal wear.**
2. Items furnished by Miller, but manufactured by others, such as engines or trade accessories. These items are covered by the manufacturer's warranty, if any.
3. Equipment that has been modified by any party other than Miller, or equipment that has been improperly installed, improperly operated or misused based upon industry standards, or equipment which has not had reasonable and necessary maintenance, or equipment which has been used for operation outside of the specifications for the equipment.

MILLER PRODUCTS ARE INTENDED FOR PURCHASE AND USE BY COMMERCIAL/INDUSTRIAL USERS AND PERSONS TRAINED AND EXPERIENCED IN THE USE AND MAINTENANCE OF WELDING EQUIPMENT.

In the event of a warranty claim covered by this warranty, the exclusive remedies shall be, at Miller's option: (1) repair; or (2) replacement; or, where authorized in writing by Miller in appropriate cases, (3) the reasonable cost of repair or replacement at an authorized Miller service station; or (4) payment of or credit for the purchase price (less reasonable depreciation based upon actual use) upon return of the goods at customer's risk and expense. Miller's option of repair or replacement will be F.O.B., Factory at Appleton, Wisconsin, or F.O.B. at a Miller authorized service facility as determined by Miller. Therefore no compensation or reimbursement for transportation costs of any kind will be allowed.

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Owner's Record

Please complete and retain with your personal records.

Model Name Serial/Style Number

Purchase Date (Date which equipment was delivered to original customer.)

Distributor

Address

City

State Zip

For Service

Call 1-800-4-A-Miller or see our website at www.MillerWelds.com to locate a DISTRIBUTOR or SERVICE AGENCY near you.

Always provide Model Name and Serial/Style Number.

Contact your Distributor for:	Welding Supplies and Consumables
	Options and Accessories
	Personal Safety Equipment
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	Technical Manuals (Servicing Information and Parts)
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For assistance in filing or settling claims, contact your distributor and/or equipment manufacturer's Transportation Department.	

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